



**AQUATIC MONITORING REPORT FOR AQUATIC SAMPLE  
SITE BRFK-4 LOCATED NEAR ROARING FORK IN WISE  
COUNTY, VIRGINIA**

**Prepared for:  
Red River Coal Company, Inc**

**Authored by:  
Chris Isaac**

**ATS PROJECT NO. 1199.01**

**August 2015**

## **I. INTRODUCTION**

Appalachian Technical Services, Inc. was contracted by Red River Coal Company, Inc. to conduct aquatic monitoring near Roaring Fork in Wise County, Virginia. This report represents the fall 2015 aquatic biological assessment of aquatic sample site BRFK-4. The permit boundary and sample site location are shown on the attached topographical map in Figure 1.

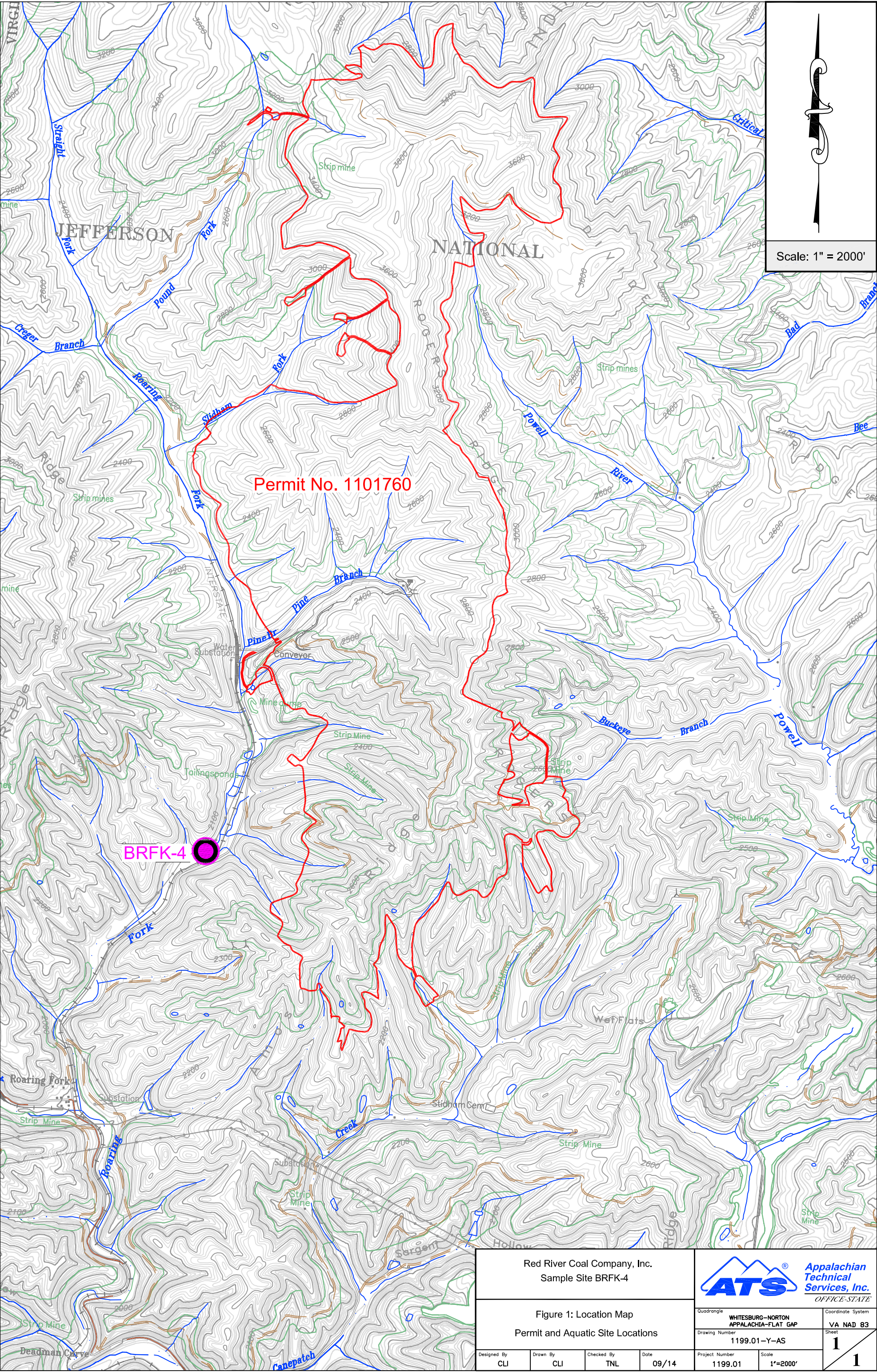
## **II. METHODS**


General locations of all sample sites were selected by a Virginia DMLR biologist. However, the exact site locations may have been relocated by ATS senior biologists due to site conditions (*i.e.* low flow, lack of riffle habitat, etc.) and accessibility. Aquatic sampling site BRFK-4 was located on Roaring Fork approximately 50 m downstream of the confluence with an unnamed tributary (37.98566; 82.72425).

Data collections for the aquatic monitoring consisting of habitat data, macroinvertebrates, surface water grab samples and physiochemical water quality data were collected on 17 August 2015 by ATS Biological Technicians James Breeding and Brian Bledsoe.


### **A. Habitat Assessments**

Rapid Bioassessment Protocol (RBP) high gradient data sheets were used to assess the habitat for each stream. The RBP sheets score each site's habitat based on 10 criteria with 1 - 20 possible points each (for a max total of 200). Based on the 2008 *Methods for Assessing Biological Integrity of Surface Waters in Kentucky, Revision 3* (KDOW 2008), stream habitat in the central Appalachians Ecoregion is considered not supporting its designated use if the total score is less than or equal to 116 total points. Habitat must score 117 – 159 to achieve a partially supporting criterion. To qualify as fully supporting habitat, it must score at least 160 total points. Copies of the stream habitat data sheets are attached in Appendix A.





Scale: 1" = 2000'

Red River Coal Company, Inc. Sample Site BRFK-4				 <b>Appalachian Technical Services, Inc.</b> <small>OFFICE-STATE</small>	
Figure 1: Location Map Permit and Aquatic Site Locations				Quadrangle WHITESBURG-NORTON APPALACHIA-FLAT GAP	Coordinate System VA NAD 83
				Drawing Number 1199.01-Y-AS	Sheet 1
Designed By CLI	Drawn By CLI	Checked By TNL	Date 09/14	Project Number 1199.01	Scale 1"=2000'

**B. Aquatic Macroinvertebrates**

Macroinvertebrates were collected using the single habitat approach as described in sections 7.1.1 and 7.3.1 of the *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition* (Barbour et al. 1999).

Macroinvertebrates were collected by agitating a riffle area of 0.25 meters in front of a standard size (500  $\Phi$ m mesh) kicknet. This process was repeated eight times to achieve 2 square meters of sample area. Upon collection, samples from each site were placed in individual containers of 95% ethyl alcohol, labeled, and returned to the lab.

Subsampling procedures followed methods within Appalachian Technical Services, Inc.'s Virginia Department of Environmental Quality approved *Quality Assurance Project Plan for Biological Monitoring, 2010* and resulted in the identification of approximately 110 ( $\pm 10\%$ ) individuals. All macroinvertebrates were identified by a North American Benthological Society certified taxonomist to family level with the exception of Chironomidae and Oligochaeta.

Macroinvertebrate metrics were calculated based on the methods included in *A Stream Condition Index for Virginia Non-Coastal Streams* (Tetra Tech, Inc. 2003). ATS biologists used the Ecological Data Application System (EDAS) to statistically rarify the samples to 110 organisms and calculate VSCI scores. The VSCI is used to compare streams to reference conditions to evaluate a streams current health. A stream must score a 61 or above to qualify as acceptable water quality. In order to calculate the VSCI the following metrics were calculated from the family level aquatic macroinvertebrate data: Taxa richness; Ephemeroptera, Plecoptera, Trichoptera (EPT) Index; Percent Ephemeroptera; Percent Plecoptera + Trichoptera (less Hydropsychidae); Percent Scrapers; Percent Chironomidae; Percent of top two dominant families; and Family Biotic Index (FBI). Tables with the macroinvertebrate data are attached in Appendix B.

### **C. *Physiochemical Water Data***

Prior to any field data collections, all handheld meters were calibrated. Four water quality parameters (specific conductance, dissolved oxygen, pH, and temperature) were analyzed using a handheld meter (YSI Pro Plus). Upon return to the lab all meters received a post-calibration check to ensure validity of all measurements recorded.

In addition to handheld meters, a surface water grab sample was collected at each sample site and delivered to Environmental Monitoring Inc. for analysis. Parameters analyzed were Acidity, Alkalinity (Bicarbonate), Alkalinity (Carbonate), Total Alkalinity, Hardness, Total Iron, Total Manganese, Nitrate, Nitrite, Total Cyanide, Total Dissolved Solids, Total Phenols, Total Suspended Solids, Total Boron, Total Magnesium, Total Aluminum, Total Antimony, Total Arsenic, Total Barium, Total Beryllium, Total Cadmium, Total Chromium, Total Cobalt, Total Copper, Total Lead, Total Nickel, Total Selenium, Total Silver, Total Thallium, Total Zinc, Total Mercury, Chloride, Sulfate, and Dissolved Organic Carbon. Grab sample analysis data can be found in Appendix C.

## **III. RESULTS**

### **A. *Habitat Assessments***

The stream habitat at BRFK-4 scored 139 of 200 (Appendix A), indicating the habitat is partially supporting its designated use. The stream was approximately 20 feet wide and characterized mostly by a series of riffles and runs (Figures 2 and 3). Flow occupied >75% of the stream channel. Embeddedness was suboptimal with 25 to 50% of the substrate particles surrounded by fine sediment. The water was clear but there was slight deposition of sediment within the streambed. The stream banks were stable and with good riparian zones.

### **B. *Macroinvertebrates***

Sample site BRFK-4 had low EPT Richness (Tables 1 and 2). Sample site BRFK-4 had a FBI score of 5.55 indicating fairly water quality with fairly substantial

pollution likely (Table 2). The VSCI score for the aquatic sample site was 36.89 (Table 2).

### **C. *Physiochemical Water Data***

All handheld meters passed post-calibration tests. Specific conductance for the sample site was 1413  $\mu$ S (Table 3). All other parameters recorded appeared to be within normal limits. The results of the water chemistry grab samples are attached in Appendix C.

## **IV. CONCLUSION**

Based on RBP habitat data the sample site BRFK-4 appears to be somewhat impaired due to partially supporting habitat criterion. The sample site had a VSCI score below the impaired threshold of 61. All water parameters recorded with a handheld meter appeared to be within normal limits with an exception of an elevated specific conductance.



**Figure 2: BRFK-4 upstream view**



**Figure 3: BRFK-4 downstream view**

### **Literature Cited**

- Barbour, M. T., J. Gerritsen, B. D. Snyder, and J. B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. U.S. Environmental Protection Agency; Office of Water; Washington, D.C.
- Kentucky Division of Water (KDOW), 2008. Methods for assessing biological integrity of surface waters in Kentucky, Revision 3. Kentucky Department of Environmental Protection, Division of Water, Frankfort, Kentucky.
- Tetra Tech, Inc. 2003. A Stream Condition Index for Virginia Non-Coastal Streams. Tetra Tech, Inc. Owings Mills, Maryland. Prepared for Virginia Department of Environmental Quality, Richmond, Virginia.

# **APPENDIX A:**

## **RBP DATA**

**Benthic Macroinvertebrate Field Data Sheet (front)**

Station ID: 1199-01-BREK-4 Coregion:                      Land Use:                     

Field Team: JER, BwB Survey Reason: Bio. Monitoring Start Time: 12:55

Stream Name: Rearing Fork Location: semi down stream of unnamed tributary Finish Time: 13:20

Date: 8/17/15 Latitude: 36.98566 Longitude: 82.72925

Stream Physiochemical

Instrument ID number: YSI-PRO pH: 8.33

Temperature: 19.2 °F Conductivity: 1918 µS/cm

Dissolved Oxygen: 8.80 mg/l Did instrument pass all post calibration checks? Y/N

If NO - which parameter(s) failed and action

### Benthic Macroinvertebrate Collection

Method used (circle one) Single Habitat (circle one) Margin (circle one) None (circle one) Forest

Riffle Quality (circle one) Good (circle one) Marginal (circle one) Poor (circle one) None

Habitats sampled (circle one) Riffle (circle one) Snags (circle one) Banks (circle one) Vegetation

Area Sampled (sq. m) 2m<sup>2</sup>

### Weather Observations

Current Weather (circle one) Cloudy Clear Rain/Snow Foggy

Recent precipitation (circle one) Clear Showers Rain Storms Other

Stream flow (circle one) Low Normal Above Normal Flood

**INSTREAM WATERSHED FEATURES:**

Stream Width 20 ft

Range of Depth 1-5 ft

Average Velocity 1.5 ft/s

Discharge                      cfs

Est. Reach Length 100m

**LOCAL WATERSHED FEATURES:**

Predominant Surrounding Land Use:

☐ Surface Mining ☐ Construction ☐ Forest

☐ Deep Mining ☐ Commercial ☐ Pasture/Grazing

☐ Oil Wells ☐ Industrial ☐ Silviculture

☐ Land Disposal ☐ Row Crops ☐ Urban Runoff/Storm Sewers

### Hydraulic Structures

☐ Dams ☐ Bridge Abutments ☐ Stream Flow: ☐ Dry ☐ Pooled ☐ Low ☒ Normal ☐ Rapid/Intermittent

☐ Island ☐ Waterfalls ☐ High ☐ Very Rapid or Torrential ☐ Ephemeral ☐ Scarp

☐ Other

### Riparian Vegetation

Dominant Type: Sycamore Bplar Autumnal

☐ Trees ☐ Shrubs ☐ Canopy Cover: ☐ Fully Shaded (75-100%) ☐ Channel Alterations: ☐ Dredging ☐ Channelization ☐ Partial/Partial

☐ Grasses ☐ Herbaceous ☐ Partially Shaded (50-75%) ☐ Partially Exposed (25-50%) ☐ Fully Exposed (0-25%)

Number of strata 3

### Substrate Opt. O.P.C.

Riffle 60 % Run 40 % Pool 0 %

### High Gradient Habitat Data Sheet

	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/Available Cover	Greater than 70% of substrate favorable for epifauna colonization and fish cover; mix of snags, submerged logs, undercut banks, cobbles or other stable habitat out at slope to allow full colonization potential (i.e. log/snags that are not new fall and not transient).	40-70% mix of stable habitat; well suited for full colonization potentially adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (new/recent fall and of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat in obvious substrate unstable or lacking.
2. Embeddedness	SCORE: 20 19 18 17 16 Optimal Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment; layering of cobble provides diversity of niche space.	SCORE: 15 14 13 12 11 Suboptimal Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	SCORE: 10 9 8 7 6 Marginal Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	SCORE: 5 4 3 2 1 Poor Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
3. Velocity/Depth Regime	SCORE: 20 19 18 17 16 Optimal Cover All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). Slow is <0.3 m/s, deep is >0.5	SCORE: 15 14 13 12 11 Suboptimal Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	SCORE: 10 9 8 7 6 Marginal Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	SCORE: 5 4 3 2 1 Poor Dominated by 1 velocity/depth regime (usually slow-deep).
	SCORE: 20 19 18 17 16	SCORE: 15 14 13 12 11	SCORE: 10 9 8 7 6	SCORE: 5 4 3 2 1

## 4. Sediment Deposition

Optimal	Suboptimal	Marginal	Poor
Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment. 5-30% (20-50% for low gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on bottom; new bars; 30-50% (50-80% for low-gradient) of	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent.
SCORE: 20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

## 5. Channel Flow Status

Optimal	Suboptimal	Marginal	Poor
Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or 25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE: 20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

## 6. Channel Alteration

Optimal	Suboptimal	Marginal	Poor
Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted. Insistent habitat greatly altered or removed entirely.	Banks shored with gabion or cement over 80% of the stream reach channelized and disrupted. Insistent habitat greatly altered or removed entirely.
SCORE: 20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

## 7. Frequency of Riffles (or bays)

Optimal	Suboptimal	Marginal	Poor
Occurrence of riffles relatively frequent ratio of distance b/w riffles divided by width of the stream <7:1 (generally 1 to 7); Variety of habitats if key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequently; distance b/w riffles divided by the width of the stream is b/w 7 to 15.	Occasional riffle or bays; bottom contours provide some habitat; distance b/w riffles divided by the width of the stream is b/w 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance b/w riffles divided by the width of the stream is a ratio of >25%.
SCORE: 20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

## 8. Bank Stability (score each bank)

Optimal	Suboptimal	Marginal	Poor
Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. < 5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly located over 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas "raw" areas
SCORE RB 10 9	8 7 6	5 4 3	2 1 0

## 9. Vegetative Protection (score each bank)

Optimal	Suboptimal	Marginal	Poor
More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or non-woody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of stream bank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 5 cm or less in average stubble height.
SCORE RB 10 9	8 7 6	5 4 3	2 1 0

## 10. Riparian Vegetative Zone Width (score each bank)

Optimal	Suboptimal	Marginal	Poor
Width of riparian zone >10 m; human activities (i.e. parking lots, roads, clearcuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 m; human activities have impacted zone only minimally.	Width of riparian zone 6-12 m; human activities have impacted zone a great deal.	Width of riparian zone <4 m; little or no riparian vegetation due to human activities.
SCORE RB 10 9	8 7 6	5 4 3	2 1 0

SCORE RB 10 9

SCORE LB 10 9

8 7 6

8 7 6

5 4 3

5 4 3

2 1 0

2 1 0

SCORE

139

# **APPENDIX B:**

## **TABLES**

**Table 1.** Quantitative listings of macroinvertebrates collected 17 August 2015 from one aquatic sample site near Roaring Fork in Wise County, Virginia.

Order	Family	Fall 2015
		BRFK-4
Ephemeroptera		3
Plecoptera	Leuctridae	2
	Peltoperlidae	1
Trichoptera	Hydropsychidae	64
	Rhyacophilidae	1
Diptera	Athericidae	2
	Chironomidae	22
	Empididae	1
	Simuliidae	2
Odonata	Gomphidae	1
Megaloptera	Corydalidae	1
	Sialidae	2
Annelida	Oligochaeta	7
		109

**Table 2.** VSCI metrics calculated from the macroinvertebrates collected 17 August 2015 at one aquatic sample site near Roaring Fork in Wise County, Virginia

Family Metrics	Fall 2015
	BRFK-4
Taxa Richness	13
EPT Taxa	5
% Ephemeroptera	2.75
% PT - Hydropsychidae	3.70
% Scrapers	0.00
% Chironomidae	20.18
% 2 Dominant	78.90
FBI	5.55
VSCI	36.89

**Table 3.** Physiochemical water data collected 17 August 2015 at one aquatic sample site near Roaring Fork in Wise County, Virginia.

Parameter	BRFK-4
Temperature (Celsius)	19.2
Specific Conductance ( $\mu$ S)	1413
pH	8.33
Dissolved Oxygen mg/l)	8.8

# **APPENDIX C:**

## **GRAB SAMPLE ANALYSIS**



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5730 INDUSTRIAL PARK RD. ▲ NORTON, VIRGINIA 24273 ▲ 276/679-6544

## Certificate of Analysis

Page: 1 of 3

Client Name: RED RIVER COAL COMPANY

Address: P.O. BOX 668

NORTON, VA

24273

Report Date: 09/01/15

Lab Sample No.: **1546906**

Client No.: 95

EMI Project No.: 97

Sample Identification: 1101760 - BRFK-4

Date Collected: 08/17/15

Time Collected: 1255

Sample Matrix: AQ

Collected By: J. BREEDING

Site Description:

Parameter	Sample Result	Units	MDL	RL	Method	Date Analyzed	Time Analyzed	Analyst
Acidity, Hot	BDL	mg/l CaCO <sub>3</sub>	4.00	4.00	SM 2310B-2011	8/18/2015	1217	THR
Alkalinity	196	mg/l CaCO <sub>3</sub>	4.00	4.00	SM 2320B-2011	8/18/2015	957	THR
Alkalinity, CO <sub>3</sub> (Not NELAP)	3.86	mg/l CaCO <sub>3</sub>			SM 4500-CO <sub>2</sub> -D-2011	8/19/2015	1008	MRC
Alkalinity, HC0 <sub>3</sub> (Not NELAP)	192	mg/l CaCO <sub>3</sub>			SM 4500-CO <sub>2</sub> -D-2011	8/19/2015	1008	MRC
Bromide	0.075 J	mg/l	0.074	0.600	EPA 300.0	8/18/2015	1354	CNS
Chloride	BDL	mg/l	0.366	5.00	EPA 300.0	8/18/2015	1518	CNS
Conductivity	1427	umhos/cm	10.0	10.0	SM 2510B-2011	8/18/2015	1132	AKN
Cyanide, Total	BDL	ug/l	2.62	10.0	EPA 335.4	8/30/2015	1952	JLW
Flow, Measured (Not NELAP)	3433	gpm				8/17/2015	1255	FLD
Hardness, Total	620	mg/l CaCO <sub>3</sub>	4.00	4.00	SM 2340 C-2011	8/18/2015	1218	THR
Nitrate	1.16	mg/l	0.050	0.600	EPA 300.0	8/18/2015	1354	CNS
Nitrite	1.36	mg/l	0.031	0.400	EPA 300.0	8/19/2015	1151	THR
pH (Not NELAP)	8.33	STD			SM 4500-H+B-2011	8/17/2015	1255	FLD
Sulfate	549	mg/l	0.568	25.0	EPA 300.0	8/19/2015	1226	THR
Total Dissolved Solids	1062	mg/l	1.00	1.00	SM 2540 C-2011	8/18/2015	808	JRS
Total Suspended Solids	4.60	mg/l	1.00	1.00	SM 2540 D-2011	8/17/2015	1854	TSE

To the best of our knowledge and belief, the collection, preservation, and analysis of all parameters represented by this report have been determined to comply the requirements as specified in 40 CFR, Part 136.

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VA Laboratory ID#: 460038

WV Laboratory ID#: 105

KY Laboratory ID#: 98012

EPA Laboratory ID#: VA00010

The release of this report is authorized by:

R. J. Porter

Technical Director

Flow if Available (GPM): 3433.0  
Temp. if Available (C): 19.2  
Depth if Available (Ft):  
Analysis Package Code: EPA0902R

Type of Sample: Grab  
BDL = Below Detection Limit  
FLD = Field Technician  
MR = Multiple analytical runs were used for this result  
IV = Flag indicates Insufficient Sample Volume  
SV = Sample volume indicated by method not used  
AB = Analyte found in Method Blank  
MSF = Matrix Spike Failure - Method in Control  
EV = Estimated Value: Outside of calibration range

J = Flag indicates estimated value below Report Limit  
T = Results indicate possible toxicity which is expected to influence reported value.  
NA = A result for this analyte is not available.  
MI = Matrix Interference - Final result may not be representative.  
BQ = Batch QC Outside Acceptable Range  
HE = Parameter Hold Time Exceeded  
FC = Failure to Comply Current SOP  
R = Sample results rejected because of gross deficiencies in QC or method performance.  
DC = Duplicate did not meet method criteria, method process in control  
P = Sample was not properly preserved for this parameter.



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Report Date: 09/01/15

Lab Sample No.: **1546906**

Client No.: 95

EMI Project No.: 97

Sample Identification: 1101760 - BRFK-4

Date Collected: 08/17/15

Time Collected: 1255

Sample Matrix: AQ

Site Description:

Collected By: J. BREEDING

Parameter	Sample Result	Units	MDL	RL	Method	Date Analyzed	Time Analyzed	Analyst
Aluminum, Total	0.091	mg/l	0.0092	0.050	200.7	8/18/2015	2139	AWM
Antimony, Total	BDL	ug/l	0.204	2.00	200.8	8/18/2015	1729	CLS
Arsenic, Total	0.171 J	ug/l	0.041	2.00	200.8	8/18/2015	1729	CLS
Barium, Total	34.1	ug/l	0.140	2.00	200.8	8/18/2015	1729	CLS
Beryllium, Total	BDL	ug/l	0.036	2.00	200.8	8/18/2015	1729	CLS
Boron, Total	BDL	mg/l	0.016	0.030	200.7	8/18/2015	1314	AWM
Cadmium, Total	BDL	ug/l	0.027	2.00	200.8	8/18/2015	1729	CLS
Chromium, Total	0.315 J	ug/l	0.057	2.00	200.8	8/18/2015	1729	CLS
Cobalt, Total	0.178 J	ug/l	0.068	2.00	200.8	8/18/2015	1729	CLS
Copper, Total	0.397 J	ug/l	0.328	2.00	200.8	8/18/2015	1729	CLS
Iron, Total	0.189	mg/l	0.0091	0.050	200.7	8/19/2015	1747	AWM
Lead, Total	0.097 J	ug/l	0.078	2.00	200.8	8/18/2015	1729	CLS
Magnesium, Total	67.8	mg/l	0.0069	0.500	EPA 200.7	8/18/2015	1455	AWM
Manganese, Total	0.040 J	mg/l	0.0016	0.050	200.7	8/19/2015	1747	AWM
Mercury, Total	0.100 J	ug/l	0.062	0.500	EPA 245.1-REV.3	8/24/2015	1325	CLS
Nickel, Total	0.522 J	ug/l	0.088	2.00	200.8	8/18/2015	1729	CLS
Selenium, Total	3.25	ug/l	0.457	2.00	200.8	8/18/2015	1729	CLS



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## Certificate of Analysis

Page: 3 of 3

Client Name: RED RIVER COAL COMPANY

Address: P.O. BOX 668

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Report Date: 09/01/15

Lab Sample No.: **1546906**

Client No.: 95

EMI Project No.: 97

Sample Identification: 1101760 - BRFK-4

Date Collected: 08/17/15

Time Collected: 1255

Site Description:

Sample Matrix: AQ

Collected By: J. BREEDING

Parameter	Sample Result	Units	MDL	RL	Method	Date Analyzed	Time Analyzed	Analyst
Silver, Total	BDL	ug/l	0.061	2.00	200.8	8/18/2015	1729	CLS
Thallium, Total	BDL	ug/l	0.222	2.00	200.8	8/18/2015	1729	CLS
Zinc, Total	BDL	ug/l	1.25	5.00	200.8	8/19/2015	1528	CLS

# Client Sample Results

Client: Environmental Monitoring, Inc.  
Project/Site: 95.97

TestAmerica Job ID: 680-115815-4

## Client Sample ID: 1546905 BCPT-1

Date Collected: 08/17/15 11:20

Date Received: 08/19/15 10:28

## Lab Sample ID: 680-115815-4

Matrix: Water

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	0.025	U	0.050	0.025	mg/L	—	08/26/15 15:05	08/26/15 17:44	1

### General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	2.1		1.0	0.50	mg/L	—		08/24/15 13:00	1

## Client Sample ID: 1546906 BRFK-4

Date Collected: 08/17/15 12:55

Date Received: 08/19/15 10:28

## Lab Sample ID: 680-115815-5

Matrix: Water

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	0.025	U	0.050	0.025	mg/L	—	08/26/15 15:05	08/26/15 17:37	1

### General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	1.3		1.0	0.50	mg/L	—		08/24/15 13:00	1

## Client Sample ID: 1546907 BRFK-1

Date Collected: 08/17/15 13:45

Date Received: 08/19/15 10:28

## Lab Sample ID: 680-115815-6

Matrix: Water

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	0.025	U	0.050	0.025	mg/L	—	08/26/15 15:05	08/26/15 17:44	1

### General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	1.2		1.0	0.50	mg/L	—		08/24/15 13:00	1

## Client Sample ID: 1546908 BRFK-2

Date Collected: 08/17/15 14:35

Date Received: 08/19/15 10:28

## Lab Sample ID: 680-115815-7

Matrix: Water

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	0.025	U	0.050	0.025	mg/L	—	08/26/15 15:05	08/26/15 17:44	1

### General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	1.1		1.0	0.50	mg/L	—		08/24/15 13:00	1

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Savannah

5102 LaRoche Avenue

Savannah, GA 31404

Tel: (912)354-7858

TestAmerica Job ID: 680-115815-4

Client Project/Site: 95.97

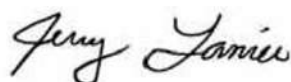
For:

Environmental Monitoring, Inc.

5730 Industrial Park Avenue

Norton, Virginia 24273

Attn: Donna Phillips



Authorized for release by:

8/27/2015 8:11:04 PM

Jerry Lanier, Project Manager I

(912)354-7858 e.3410

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(912)354-7858 e.3004

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### LINKS

Review your project  
results through

TotalAccess

Have a Question?



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[www.testamericainc.com](http://www.testamericainc.com)

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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## Case Narrative

Client: Environmental Monitoring, Inc.  
Project/Site: 95.97

TestAmerica Job ID: 680-115815-4

**Job ID: 680-115815-4**

**Laboratory: TestAmerica Savannah**

### Narrative

## CASE NARRATIVE

**Client: Environmental Monitoring, Inc.**

**Project: 95.97**

**Report Number: 680-115815-4**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

### RECEIPT

The samples were received on 08/19/2015; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.4 C.

### PHENOLS

Samples 1546905 BCPT-1 (680-115815-4), 1546906 BRFK-4 (680-115815-5), 1546907 BRFK-1 (680-115815-6) and 1546908 BRFK-2 (680-115815-7) were analyzed for phenols in accordance with EPA Method 420.1. The samples were prepared and analyzed on 08/26/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### DOC

Samples 1546905 BCPT-1 (680-115815-4), 1546906 BRFK-4 (680-115815-5), 1546907 BRFK-1 (680-115815-6) and 1546908 BRFK-2 (680-115815-7) were analyzed for DOC in accordance with SM 5310\_DOC\_C. The samples were analyzed on 08/24/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Sample Summary

Client: Environmental Monitoring, Inc.  
Project/Site: 95.97

TestAmerica Job ID: 680-115815-4

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-115815-4	1546905 BCPT-1	Water	08/17/15 11:20	08/19/15 10:28
680-115815-5	1546906 BRFK-4	Water	08/17/15 12:55	08/19/15 10:28
680-115815-6	1546907 BRFK-1	Water	08/17/15 13:45	08/19/15 10:28
680-115815-7	1546908 BRFK-2	Water	08/17/15 14:35	08/19/15 10:28

## Method Summary

Client: Environmental Monitoring, Inc.  
Project/Site: 95.97

TestAmerica Job ID: 680-115815-4

Method	Method Description	Protocol	Laboratory
420.1	Phenolics, Total Recoverable	MCAWW	TAL SAV
SM 5310C	Organic Carbon, Dissolved (DOC)	SM	TAL NSH

### Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.  
SM = "Standard Methods For The Examination Of Water And Wastewater",

### Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177  
TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

## Definitions/Glossary

Client: Environmental Monitoring, Inc.  
Project/Site: 95.97

TestAmerica Job ID: 680-115815-4

### Qualifiers

#### General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# QC Sample Results

Client: Environmental Monitoring, Inc.  
Project/Site: 95.97

TestAmerica Job ID: 680-115815-4

## Method: 420.1 - Phenolics, Total Recoverable

Lab Sample ID: MB 680-398195/1-A  
Matrix: Water  
Analysis Batch: 398304

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 398195

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	0.025	U	0.050	0.025	mg/L		08/26/15 15:05	08/26/15 17:37	1

Lab Sample ID: LCS 680-398195/2-A  
Matrix: Water  
Analysis Batch: 398304

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 398195

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phenolics, Total Recoverable	0.100	0.0969		mg/L		97	75 - 125

Lab Sample ID: LCSD 680-398195/3-A  
Matrix: Water  
Analysis Batch: 398304

Client Sample ID: Lab Control Sample Dup  
Prep Type: Total/NA  
Prep Batch: 398195

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Phenolics, Total Recoverable	0.100	0.0959		mg/L		96	75 - 125	1	30

Lab Sample ID: 680-115815-5 MS  
Matrix: Water  
Analysis Batch: 398304

Client Sample ID: 1546906 BRFK-4  
Prep Type: Total/NA  
Prep Batch: 398195

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Phenolics, Total Recoverable	0.025	U	0.100	0.0974		mg/L		97	75 - 125

Lab Sample ID: 680-115815-5 MSD  
Matrix: Water  
Analysis Batch: 398304

Client Sample ID: 1546906 BRFK-4  
Prep Type: Total/NA  
Prep Batch: 398195

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Phenolics, Total Recoverable	0.025	U	0.100	0.0942		mg/L		94	75 - 125	3	30

## Method: SM 5310C - Organic Carbon, Dissolved (DOC)

Lab Sample ID: MB 490-276210/1  
Matrix: Water  
Analysis Batch: 276210

Client Sample ID: Method Blank  
Prep Type: Dissolved

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	0.50	U	1.0	0.50	mg/L			08/24/15 13:00	1

Lab Sample ID: LCS 490-276210/4  
Matrix: Water  
Analysis Batch: 276210

Client Sample ID: Lab Control Sample  
Prep Type: Dissolved

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Organic Carbon	10.0	9.85		mg/L		99	90 - 110

TestAmerica Savannah

# QC Association Summary

Client: Environmental Monitoring, Inc.  
Project/Site: 95.97

TestAmerica Job ID: 680-115815-4

## General Chemistry

### Analysis Batch: 276210

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-115815-4	1546905 BCPT-1	Dissolved	Water	SM 5310C	
680-115815-5	1546906 BRFK-4	Dissolved	Water	SM 5310C	
680-115815-6	1546907 BRFK-1	Dissolved	Water	SM 5310C	
680-115815-7	1546908 BRFK-2	Dissolved	Water	SM 5310C	
LCS 490-276210/4	Lab Control Sample	Dissolved	Water	SM 5310C	
MB 490-276210/1	Method Blank	Dissolved	Water	SM 5310C	

### Prep Batch: 398195

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-115815-4	1546905 BCPT-1	Total/NA	Water	Distill/Phenol	
680-115815-5	1546906 BRFK-4	Total/NA	Water	Distill/Phenol	
680-115815-5 MS	1546906 BRFK-4	Total/NA	Water	Distill/Phenol	
680-115815-5 MSD	1546906 BRFK-4	Total/NA	Water	Distill/Phenol	
680-115815-6	1546907 BRFK-1	Total/NA	Water	Distill/Phenol	
680-115815-7	1546908 BRFK-2	Total/NA	Water	Distill/Phenol	
LCS 680-398195/2-A	Lab Control Sample	Total/NA	Water	Distill/Phenol	
LCSD 680-398195/3-A	Lab Control Sample Dup	Total/NA	Water	Distill/Phenol	
MB 680-398195/1-A	Method Blank	Total/NA	Water	Distill/Phenol	

### Analysis Batch: 398304

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-115815-4	1546905 BCPT-1	Total/NA	Water	420.1	398195
680-115815-5	1546906 BRFK-4	Total/NA	Water	420.1	398195
680-115815-5 MS	1546906 BRFK-4	Total/NA	Water	420.1	398195
680-115815-5 MSD	1546906 BRFK-4	Total/NA	Water	420.1	398195
680-115815-6	1546907 BRFK-1	Total/NA	Water	420.1	398195
680-115815-7	1546908 BRFK-2	Total/NA	Water	420.1	398195
LCS 680-398195/2-A	Lab Control Sample	Total/NA	Water	420.1	398195
LCSD 680-398195/3-A	Lab Control Sample Dup	Total/NA	Water	420.1	398195
MB 680-398195/1-A	Method Blank	Total/NA	Water	420.1	398195

## Certification Summary

Client: Environmental Monitoring, Inc.  
Project/Site: 95.97

TestAmerica Job ID: 680-115815-4

### Laboratory: TestAmerica Savannah

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Virginia	NELAP	3	460161	06-14-16

### Laboratory: TestAmerica Nashville

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Virginia	NELAP	3	460152	06-14-16

SUB-WORK REQUIRED  
COPY TO CLIENT

# EPA/RPA PROJECTS CHAIN OF CUSTODY

**ENVIRONMENTAL MONITORING, INC**

P.O. BOX 1190 \* NORTON VA 24273 \* 276-679-6544

C043077



Proj. Description: <u>1101760</u> <u>1199.01-ATS#</u>	EPA Sampling
EMI Project #: <u>95.97</u>	Emi Project Manager: RJP
COLLECTED BY: <u>James Breeding, Brian Bledsoe</u>	

							EPA 0902R BROMIDE	TOTAL METALS, HARDNESS	DISSOLVED ORGANIC CARBON	PHENOLS	CYANIDE	DISSOLVED METALS				
							PRESERVATIVE USED:									
EMI NO.	EMI SAMPLE #	CUSTOMER SAMPLE IDENTIFICATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	NO. OF CONT.	COOL < 6°C	HNO <sub>3</sub>	FILT. HCL	H <sub>2</sub> SO <sub>4</sub>	NaOH	FILT. HNO <sub>3</sub>	PH	TEMP	FLOW	REMARKS
	<u>1546905</u>	<u>BCPT-1</u>	<u>8-17-15</u>	<u>11:20</u>		<u>6</u>							<u>8.21</u>	<u>21.4</u>	<u>1.845</u>	<u>827</u>
	<u>906</u>	<u>BRFK-4</u>	<u>8-17-15</u>	<u>12:55</u>		<u>6</u>							<u>8.33</u>	<u>19.2</u>	<u>7.663</u>	<u>3433</u>
	<u>907</u>	<u>BRFK-1</u>	<u>8-17-15</u>	<u>13:45</u>		<u>6</u>							<u>8.85</u>	<u>18.2</u>	<u>4.47</u>	<u>2003</u>
	<u>908</u>	<u>BRFK-2</u>	<u>8-17-15</u>	<u>14:35</u>		<u>6</u>							<u>8.29</u>	<u>21.0</u>	<u>7.412</u>	<u>3321</u>

All samples requiring pH  
preservation were verified to be  
as indicated on COC by MRC  
Date: 8-17-15 Time: 1555

BIN # 21 EMI pH Meter # \_\_\_\_\_

COOLER TEMP 2.8°C ICE CHECKED BY: MRC Number of Containers this Page: 24

Relinquished by: [Signature] Date: 8/17/15 Time: 1555 Received by: [Signature]  
Relinquished by: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Time: \_\_\_\_ Received by: \_\_\_\_\_